

Spot Safety Project Evaluation

Project Log # 200404176

Spot Safety Project # 03-96-400

**Spot Safety Project Evaluation, of the Directional Crossover Installation, at the Intersection of
US 17 and Parkwood Drive-Western Shopping Plaza in Jacksonville, Onslow County**

Documents Prepared By:

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Date

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 03-96-400 – The Intersection of US 17 and Parkwood Drive-Western Shopping Plaza, Jacksonville, Onslow County

Introduction

In an attempt to assess the safety of our roads, the Safety Evaluation Section of the Traffic Safety Systems Management Unit has evaluated the above project. A naive before and after analysis has been completed to measure the effectiveness of the spot safety improvement. This information is provided to you so the benefit or lack of benefit for this type of project can be recognized and utilized for future projects.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the construction of raised islands in the crossover to prevent through and left turn movements from the side street approaches. Mayor Marvin Choate and the Jacksonville Police Department originally requested the directional crossover. US 17 is a four lane divided facility with a speed limit of 45 mph at this location. The crossover provides access to the Western Shopping Center that contains a Wal-Mart, Wilson's Food Store, and several other shops. Parkwood Drive provides access to a large residential area. Both side streets are under stop sign control.

The wide, full movement crossover at the subject intersection allowed vehicles to stack inside the crossover, causing sight distance problems for motorists attempting to access US 17 from Western Plaza Shopping Center and Parkwood Drive. The initial crash analysis for this location was completed from April 1, 1992 through March 31, 1996 with a total of 75 reported crashes. There were 41 Angle crashes, 25 Left-Turn crashes, and 9 Random crashes. Three class A, 22 class B, and 45 class C injuries resulted. The final completion date for the directional crossover installation at the subject intersection was on January 5, 1998.

Naive Before and After Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from November 1, 1997 through February 28, 1998. The before period consisted of reported crashes from July 1, 1992 through October 31, 1997 (5 Years, 4 Months) and the after period consisted of reported crashes from March 1, 1998 through June 30, 2003 (5 Years, 4 Months). The ending date for this analysis was determined by the available crash data at the time the crash analysis was completed. Please see attached *Location Map* for further detail.

The attached data Table 1 depicts the Naive Before and After Analysis for the Treatment Intersection, consisting of an overall crash summary and a crash type summary. The overall crash summary contains high level crashes, crash rates, and vehicle exposure statistics. The crash type summary contains crashes broken down by accident type. Before period crash data, after period crash data, and the percent change in crashes from the before to the after period are also included. The before period ADT year was 1995, and the after period ADT year was 2000. The treatment data consisted of all crashes within a 0 feet Y-Line of the subject intersection.

As shown in Table 1, the naive before and after analysis at the Treatment Intersection resulted in a 95.7 percent decrease in Total Crashes, a 95.7 percent decrease in the Total Crash Rate, a 32.2 percent decrease in the Severity Index, and a 0.4 percent increase in Average Daily Traffic (ADT). Analysis of the treatment location also resulted in a 100 percent decrease in Angle Crashes, a 100 percent decrease in Left Turn-Different Roadway Crashes, and an 80.0 percent decrease in Left Turn-Same Roadway Crashes.

In order to test for crash migration, a naive before and after analysis was also performed at both signalized intersections north and south of the treatment and on US 17 within the treatment influence area. The two intersections with US 17 that were analyzed are as follows: SR 1470-Western Boulevard and McDaniel Drive-Workshop Lane. The section on US 17 that was analyzed is from 150' south of SR 1470-Western Boulevard to 150' north of McDaniel Drive-Workshop Lane. The data for both signalized intersections and the section consisted of all crashes within a 150 feet Y-line. The following table is a summary of Total Crashes within the treatment influence area.

Overall Total Crash Summary within Treatment Influence Area

	Before	After	Percent Reduction (-)/ Percent Increase (+)	Statistically* Significant
Treatment Intersection	92	4	- 95.7	Yes
US 17 at McDaniel Dr-Workshop Ln	21	65	209.5	Yes
US 17 at SR 1470-Western Blvd	173	184	6.4	No
US 17 Section	325	313	- 3.8	No

*Statistical significance tested at the 90% confidence interval using the T Test methodology.

The naive before and after analysis at the signalized intersections surrounding the treatment resulted in a 209.5 percent increase and a 6.4 percent increase in Total Crashes. US 17 within the treatment influence area resulted in a 3.8 percent decrease in Total Crashes.

Results and Discussion

The naive before and after analysis at the Treatment Intersection resulted in a 95.7 percent decrease in Total Crashes, a 95.7 percent decrease in the Total Crash Rate, and a 32.2 percent decrease in the Severity Index. Analysis of the treatment location also resulted in a significant decrease in Angle Crashes and Left-Turn Crashes.

The naive before and after analysis of the signalized intersections on either side of the treatment location displays an increase in crashes. This increase in crashes may be attributed to the installation of the directional crossover at Treatment Intersection. The constructed raised islands in the crossover prevent through and left turn movements from the side streets. Therefore, motorists wishing to turn left from either Parkwood Drive or Western Shopping Plaza onto US 17 will need to access US 17 from the signalized intersection to the north or south. See the attached *Aerial Photograph* for a visual representation of the potential alternate routes.

The section on US 17 that was analyzed from 150' south of SR 1470-Western Boulevard to 150' north of McDaniel Drive-Workshop Lane displayed a 3.8 percent decrease in crashes. A majority of crashes on this section were concentrated at the treatment intersection and at the two signalized intersections.

The intersection of US 17 and McDaniel Drive-Workshop Lane displayed a 209.5 percent increase in crashes. The additional traffic volume accessing US 17 from McDaniel Drive-Workshop Lane as a result of the treatment may have contributed to the increase in crashes. Both McDaniel Drive and Workshop Lane are low volume city streets. (The 1996 ADT of McDaniel Drive and Workshop Lane was approximately 2500 and 800, respectively.) A signal was installed at the intersection of US 17 at McDaniel Drive-Workshop Lane in 1997 prior to the directional crossover construction. This intersection was previously stop sign controlled. An investigation of the crashes at US 17 and McDaniel Drive-Workshop Lane revealed that at least 25 out of 65 (40%) crashes in the after period were red light violation type crashes possibly attributed to the signal installation. The crash report review also displayed no U-turn type crashes in the after period at this signalized intersection.

The intersection of US 17 and SR 1470-Western Blvd had a 6.4 percent increase in crashes. It is unlikely that the additional traffic volume accessing US 17 from SR 1470-Western Blvd, as a result of the treatment, contributed to the increase in crashes. The 1996 ADT of SR 1470-Western Boulevard south of US 17 was 31,700. A detailed review of the crash reports resulted in no crash trends within the after period attributable to the treatment location.

The summary results above demonstrate that in the naive before and after analysis method the treatment location appears to have had a dramatic crash reduction in all crash types from the before to the after period. However, when looking at the 0.43-mile strip surrounding the treatment location, there is only a minimal reduction in crashes. Although both surrounding signalized intersections displayed an increase in crashes, it is not conclusive that the treatment had a negative effect on them.

As the Safety Evaluation Section completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors.

Further Information

As previously mentioned, a traffic signal was installed at the intersection of US 17 and McDaniel Drive - Workshop Lane in 1997. A study of this intersection will be performed at a later date to evaluate the traffic signal installation countermeasure.

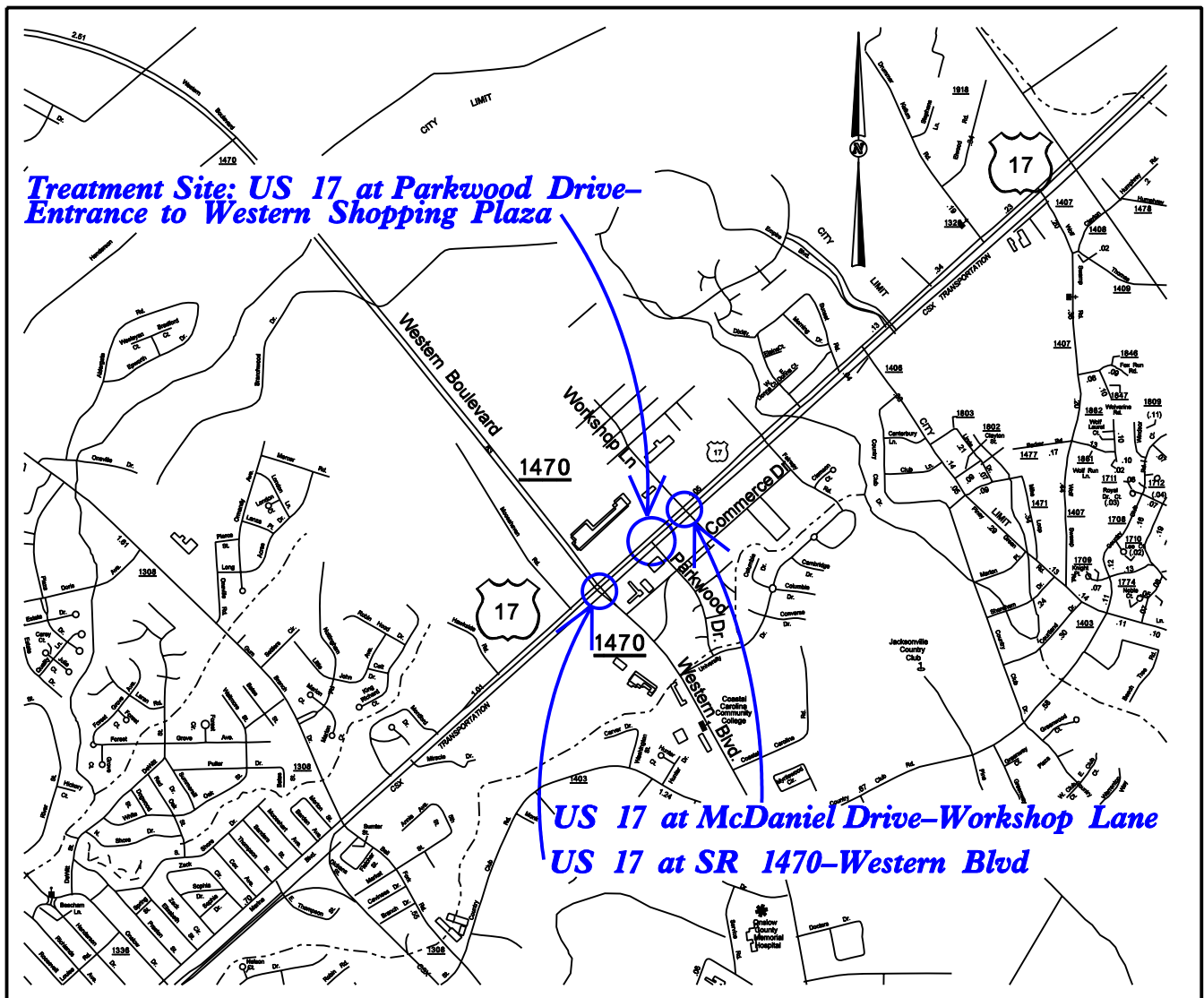
Table 1. Treatment Intersection Overall Crash Summary and Crash Type Summa

OVERALL CRASH SUMMARY	Before Period	After Period	Percent Change
Total Crashes	92	4	-95.7
Fatal Crashes	0	0	n/a
Non-Fatal Injury Crashes	46	2	-95.7
Total Injury Crashes	46	2	-95.7
PDO Crashes	46	2	-95.7
Night Crashes	19	1	-94.7
Wet Crashes	12	1	-91.7
Total Crash Rate	191.11	8.28	-95.7
Fatal Crash Rate	0	0	n/a
Non Fatal Crash Rate	95.55	4.14	-95.7
Night Crash Rate	39.47	2.07	-94.8
Wet Crash Rate	24.93	2.07	-91.7
Annual ADT	24700	24800	0.4
Total Vehicle Exposure	48.14	48.31	0.4
Severity Index	6.93	4.7	-32.2

CRASH TYPE SUMMARY	Before Period	After Period	Percent Change
Angle	48	0	-100.0
Backing Up	1	0	-100.0
Fixed Object	0	0	n/a
Head On	0	0	n/a
Left Turn, Different Roadways	25	0	-100.0
Left Turn, Same Roadway	10	2	-80.0
Moveable Object	0	0	n/a
Not Available	1	0	-100.0
Other Collision With Vehicle	0	0	n/a
Other Non-Collision	0	0	n/a
Overturn/Rollover	0	0	n/a
Parked Motor Vehicle	0	0	n/a
Pedalcyclist	1	0	-100.0
Pedestrian	0	0	n/a
Ran Off Road - Left	0	0	n/a
Ran Off Road - Right	0	0	n/a
Ran Off Road - Straight	0	0	n/a
Rear End, Slow or Stop	2	0	-100.0
Rear End, Turn	0	2	n/a
Right Turn, Different Roadways	1	0	-100.0
Right Turn, Same Roadway	1	0	-100.0
Sideswipe, Opposite Direction	0	0	n/a
Sideswipe, Same Direction	2	0	-100.0
Unknown	0	0	n/a

Location Map, Jacksonville, Onslow County

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Aerial photograph of US 17 from SR 1470-Western Blvd to McDaniel Dr-Workshop Ln



Motorists that formerly turned left onto US 17 from Parkwood Drive or the Western Shopping Plaza via the crossover must now take alternate routes. Traffic may access US 17 from either McDaniel Drive-Workshop Lane to the north or SR 1470-Western Boulevard to the south. If U-turns are permitted at these signalized intersections, motorists may also perform this maneuver.

Treatment Site Location Photos (Taken on April 6, 2004)



Looking west at the Directional Crossover from Parkwood Drive



**Another view of the raised islands in the Directional Crossover
taken from just south of Parkwood Drive**

Treatment Site - Total Crashes
After Period
March 1,1998 through June 30,2003
(5 years, 4 months)



Entrance to
Western Shopping
Plaza

LEGEND

	MOVING VEHICLE		ANGLE		9 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAIN
	PAKED VEHICLE		BACKING		20 MPH TO 29		DRIVER AT FAULT
	PAKED VEHICLE		SIDESWIPE		30 MPH TO 39		DRY
	FIXED OBJECT		OUT OF CONTROL		40 MPH TO 49		WET
	HEAD ON		REAR END		50 MPH TO 59		ICY OR SNOW
	RAN OFF ROAD		FATALITY		60 MPH TO 69		70 AND UP
					SPEED UNKNOWN		ONLY

US 17

45 mph

Parkwood Drive



SS 03-96-400
After Period

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS

STUDY PERIOD: 3/1/1998 to 6/30/2003
ANALYSIS PREPARED BY: Corrie Goodrich
ANALYSIS CHECKED BY:
DIAGRAM PREPARED BY: Joseph Evans-C
SCALE: NOT TO SCALE
DATE: 7/12/2004
LOG NUMBER: SS-03-96-400